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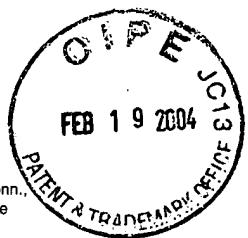
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19 February 2004

Honorable Commissioner For Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

Re: U.S. Pending Patent Application Serial No. 09/753,428

Applicant: KUNG-LIANG KEVIN SUNG ET AL

Filing Date: January 3, 2001

Title: METHOD OF MANUFACTURING WOOD-  
LIKE POLYVINYL CHLORIDE BOARDS OF LOW  
DENSITY AND IMPROVED PROPERTIES AND  
RESULTING PRODUCT

Attorney Docket No. IPC-109A

Examiner: ALLAN R. KUHNS

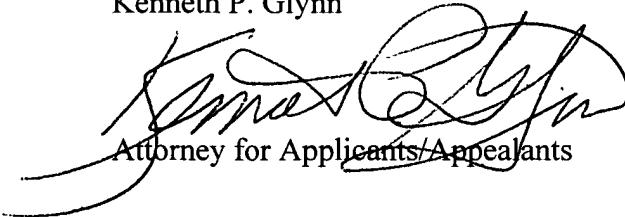
Dear Commissioner:

Enclosed please find the following regarding Appeal in the above matter:

- (1) Appeal Brief (Original & 2 copies);
- (2) Check NO. 50203986 in the amount of \$ 330.00 for the Brief;
- (3) Certificate of Mailing attached to Brief.

Thank you.

Kenneth P. Glynn



Attorney for Applicants/Appealants



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of : Examiner:  
KUNG-LIANG KEVIN SUNG et al. : ALLAN R. KUHNS  
Serial No. 09/753,428 : Group Art Unit:  
Filing Date: January 3, 2001 : 1732  
Title: METHOD OF MANUFACTURING : Attorney Docket No.  
WOOD-LIKE POLYVINYL CHLORIDE : (IPC-109A)  
BOARDS OF LOW DENSITY AND :  
IMPROVED PROPERTIES AND :  
RESULTING PRODUCT :  
Honorable Director of Patents and Trademarks  
P.O. Box 1450  
Alexandria, VA 22313-1450

APPEAL BRIEF

This brief is being filed in response to the Final  
Rejection of September 9, 2003 in the above-referenced case.

I. REAL PARTY IN INTEREST

The inventors of the instant patent application are Kung-Liang Kevin Sung and Jyh-yao Raphael Li. Stated inventors have assigned all rights in the instant patent application to INTEPLAST GROUP, LTD. The assignment has been recorded in the United States Patent and Trademark Office on January 3, 2001.

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## II. RELATED APPEALS AND INTERFERENCES

There are no related appeals and no related interferences.

## II. STATUS OF CLAIMS

The following is a list of all claims that have been presented in this application throughout its history and the status of these claims:

<u>Claims</u>	<u>Status</u>
1-20	Initially filed, now cancelled.
21-24	Inserted by Applicants' amendment. These are the appealed claims.
25	Inserted by Applicants' amendment. Withdrawn by Examiner based upon Applicants' election in Paper No. 4.

## IV. STATUS OF AMENDMENTS

No amendment has been filed after the Final Rejection.

## V. SUMMARY OF THE INVENTION

In conjunction with this section, Figure 1b is attached hereto as Exhibit B, and is referred to in the numbering of the elements. The present invention is directed to

production of wood-like boards of polyvinylchloride, which are suitable for applications, such as graphic art, construction, furniture, etc. Component materials of suitable proportions are charged into a high intensity hot mixer 10, which completely mixes a vinyl chloride resin, wood component, foaming agent and other additives. In the central portion of the bottom surface of the mixer container is an impeller, which rotates at a high speed in a horizontal direction by a rotating means such as a motor. Though no external heating is involved, the mixtures inside the mixer 10 tend to become warmer due to the heat generated from the friction of the impeller and the mixer. The impeller rotates at a high speed of about 300 to about 1500 rpm.

In the hot mixer 10, the particles are driven, under high shearing forces, apart and also into one another. All the ingredients are literally driven into the particle of resin or uniformly dispersed. This prepares a dry blend in a uniform, dry easy-flowing condition for eventual feed to extruder 40. The temperature of the mixture in the hot mixer 10 tends to increase continuously. The mixtures are discharged to the cold mixer 20 when the temperature of the mixture is raised to a preset temperature of about 80° to about 140° Celsius. The mixture is cooled while being

agitated in the cold mixer 20. The mixture is next transferred to the extruder die assembly 40. The wood-thermoplastic mixture is introduced into the hopper of the extruder and plastified within the extruder cavity at a temperature above the fusion temperature of the thermoplastic polymer component. The plastified and melted thermoplastic mass is then extruded to form sheeting. The foamed synthetic wood board is quenched by the calibrating system 50.

When the thermoplastic mass exits the die, the high pressure exerted on the thermoplastic mass inside the die is abruptly released. The gases, which are generated from the decomposition of the foaming agents in the extruder are dissolved in the thermoplastic mass due to the high pressure inside the extruder, start to phase separate from the thermoplastic mass to form bubbles. Since the skins of the PVC and the wood composite are quenched and solidified immediately after exiting the die, the gas dissolved in the thermoplastic mass does not have time to separate from the thermoplastic mass to form bubbles, therefore smooth and solid skins are formed.

The temperature of the thermoplastic mass beneath the skins (the core) decreases slowly because PVC itself is a poor heat conductor so the heat removal in the core is slow. Before the temperature in the core drops below the

solidification temperature, the gas in the thermoplastic mass phase separate from the thermoplastic mass and form bubbles inside the core to reduce the density of the wood-thermoplastic PVC boards. When embossed surfaces are created, after the thermoplastic mass pass through the die head and die lip assembly, the product may be rolled and cooled to form embossed boards.

#### VI. ISSUES

The basic issues are as follows:

- (a) Are claims 21 through 24 anticipated under 35 U.S.C. §102(b) as being unpatentable over Cope (5,951,927)? Does Cope have all the features of the present invention?
- (b) Are claims 21 through 24 obvious under 35 U.S.C. §103(a) as being unpatentable over Cope (5,951,927)? Would one of ordinary skill in the art take the polymer of Cope and modify it to produce a wood-like product of low density with an embossed surface?

#### VII. GROUPING OF CLAIMS

In this appeal, claims 21 through 24 are directed to a synthetic wood-like product of low density, stable dimension, wood-like surface quality having an embossed

texture, good flammability resistance and outdoor weather durability.

This above grouping is recommended by the Applicants for purposes of appeal.

## VIII. ARGUMENTS

### (a) Anticipation By Cope Rejection

Claims 21 through 24 stand rejected under 35 U.S.C. §102(b) as being anticipated by Cope (5,951,927). The Examiner stated that Cope discloses the Applicants' basic claimed product structure as imputed from the method steps practiced. He further noted that the PVC or vinyl chloride resin, the wood flour or natural cellulosic product and foaming agent is described by Cope in the compositions in column 6. He additionally stated that a lubricant in the composition is also described.

In response, the Applicants submit that the Cope patent fails to establish a *prima facie* case of anticipation because the Cope disclosure lacks at least three features of the present invention. First, the present invention board includes an embossed texture outer surface product. Second, the present invention board is formed from a product having a foam skin and a foam core. Third, the present invention includes steps that necessitate a different product from the Cope patent. And fourth, the present invention relates to

the production of a board whereby products of different thickness can be easily adjusted.

First, the present invention board includes an embossed textured outer surface product while the Cope board must be a smooth surface. It is shown in lines 1 through 5, col. 5 in the Cope patent that a vacuum tank is used to produce the PVC profile. The vacuum tank uses the vacuum to shape the profile which necessitates a smooth surface to maintain the vacuum. The vacuum cannot be maintained (lost vacuum) on a surface of embossed texture because the dimension of the profile will be distorted. Therefore, the Cope invention necessitates a smooth surface of the profile, in contrast to the embossed surface of claim 21(E) of the present invention.

Furthermore, the temperatures of the rollers 112, 113 and 114 of the present invention are controlled in a range of 25° to 250° (see line 16, page 33 through line 2, page 34). According to the Polymer Handbook, glass transition temperature of PVC is 80°C. The softening point of PVC is related to the formula and is always much lower than the glass transition temperature. By maintaining the temperatures of the rollers above the PVC softening point temperature, the surface of the PVC material is kept soft. Thus, softening may occur in the surface to form an embossed

texture. In contrast to this, the Cope patent makes no use of rollers, not to mention temperatures of the rollers, in forming a surface. Thus, the Cope disclosure does not disclose an embossed surface.

Second, the present invention board is formed from a product having a foam skin and a foam core. The Applicants respectfully disagree with the Examiner's determination that Cope teaches a product having a foam skin and a foam core. The Examiner stated that referring to the description of Fig. 4, the disclosure describes the aspect of optionally leaving portions 72 and 74 of the profile without a hard skin. The Applicants respectfully interpret the outer portion of the profile having a hard skin (see col. 5. lines 65 through 66) while the portions 72 and 74 are remaining portions that are silent on the characteristic of whether the remaining portions are foamed or not. Moreover, the Applicants respectfully submit that the outer portions 66 and 68 are always hard skinned which is different from the foamed skin of the present invention. Thus, because the outer portions 66 and 68 are disclosed as being hard skinned while the disclosure is silent on the characteristic of the remaining portions, the Applicants submit that the Core product could not have an embossed finish, and must be smooth.

Another interpretation of Cope is that the remaining

portions with hard skin or without hardened skin refers to the characteristic of the remaining portions. In support of this interpretation, there are no element numbers associated with the characteristic. Thus, under this interpretation, the outer skin would still be hardened which is in contrast to the foamed outer skin of the present invention.

Moreover, the Cope patent states on col. 5, lines 27 through 35 that "The jacket 52 of the shaper 58 is kept at a temperature lower than the softening point of the extrusion material. As the material contacts the inside wall of the shaper, it begins to harden from the outside surface to the inner core." It is well known in the art that foaming of foam PVC starts after the exit of the die. Since the temperature of the jacket 52 of the shaper 58 in the Cope patent is kept at a temperature lower than the softening point, the surface layer of the PVC material is immediately solidified. Foaming cannot occur in the surface and the profile has a smooth surface with or without hard skin. In contrast to this, the present invention slowly cools the PVC material after the exit of the die. Therefore, foaming takes place on the surface of the board to form an embossed texture (see line 7, page 34 through line 4, page 35).

Third, the present invention includes steps that necessitate a different product from the Cope patent. The present invention includes a slow cooling step with rollers,

which is inconsistent with the Core disclosure. The Core patent is directed to a method of making a polymer and wood flour composite extrusion utilizing plastic extrusion materials that may be polyvinyl chloride mixed with cellulosic product. However, the Cope patent forms a consistent solid product that is a composite extrusion formed into a desired profile by an extruder and vacuum tank or shaper. As discussed herein above, the jacket 52 of the shaper 58 of Cope is kept at a temperature lower than the softening point of the extrusion material. Thus, the surface of the PVC material is immediately solidified and foaming cannot occur in the surface. Therefore, the profile of the Cope disclosure has a smooth surface, in contrast to the embossed surface of the present invention. Furthermore, no rollers or contra-rollers are used to cool down the product, in contrast to claim 21(E) of the present invention. In fact, rollers in the Cope system would defeat its purpose and adversely affect the desired profiles.

Additionally, Cope cools after mixing whereas the present invention process requires that the mixture continue to be mixed during cooling. Thus, Cope has a process that yields a high density product with different characteristics than the low density product with a foam skin and a foam core of the present invention.

And fourth, the present invention relates to the

production of a board whereby products of different thickness can be easily adjusted. Specific extrusion dies and shaper (or vacuum tank) are needed for specific profile products in the invention of the Cope patent. For a different profile product, a corresponding extrusion die and shaper need to be installed. The present invention relates to a board shaped product. Products of different thickness may be easily adjusted by the gaps between rollers 112, 113 and 114, and the extrusion die gap. Moreover, the surface texture may also be changed by the temperatures of the rollers. Thus, the Cope disclosure creates a different type product from the current invention.

Fifth, the Cope patent states in column six at lines six through eleven that after the profile is cured and hardened, various finishes may be applied and hot foil stampings may also be applied for further decorative effect.

This is because of the fast cooling under the Cope patent process causes immediate solidification of the surface layer of the product to make a smooth surface. Thus, the decorative effect can only be added by additional processes such as painting, staining and hot stamping, after production. This further shows that the profile of the Cope product has a smooth surface in contrast to the embossed surface of the present invention. Unlike the Cope process, in the present invention, the embossed texture of the

surfaces can be changed by various rollers with different embossed patterns (present application, page 35, lines 4-9).

(b) Obviousness Over Cope Rejection

Alternatively, claims 21 through 24 stand rejected under 35 U.S.C. §103(a) as obvious over Cope (5,951,927). The Examiner stated that it would have been obvious to one of ordinary skill in the art to produce a wood-like product of low density, based on the presence of a foaming agent in the composition disclosed by Cope, and of wood-like surface quality, good flammability resistance, and good outdoor weather durability, based upon the composition shaped by Cope, in order to form a less expensive alternative to solid wood products, as disclosed in col.1, lines 15 through 24 of Cope.

In response, the Applicants reiterate the arguments in section VIII (a) immediately above, and also submit that the Cope patent fails to establish a prima facie showing case of obviousness for the following reasons: First, there is no motivation to produce an embossed textured surface. Second, there is no motivation to make the product with an external foam skin and foam core.

First, there is no motivation to produce an embossed textured surface. Because the jacket of the Core scraper is kept at a temperature lower than the softening point of the

extrusion material, foaming cannot occur in the surface and the profile has a smooth surface with or without hard skin. Moreover, the Cope disclosure states that the product provides a smoother skin than the current state of the art. (see lines 11 through 12, col. 2). Thus, the product of Core specifically makes a product with smooth skin and therefore, there is no motivation to make an embossed textured product of the present invention.

Second, there is no motivation to make the product with an external foam skin and foam core. The Cope patent forms a consistent solid product that is a composite extrusion formed into a desired profile by an extruder and vacuum tank or shaper. The Cope product begins to cool as it enters the shaper and is allowed to completely cool thereafter without the use of rollers or contra rollers. The Cope patent has its cooling system imbedded within the structure of a shaper. Since, the Cope product has a specific cooling system, there is no motivation to uses rollers and contra rollers for cooling, as in the present invention. Therefore, by not needing a slow cooling step with rollers, forming a product having a foam skin and a foam core which causes an embossed surface texture is not present in the Core disclosure.

Conclusion  
The Applicants believe that it should be clear to the

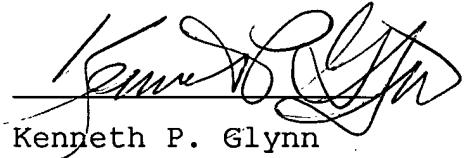
Board of Appeals that the currently pending Claims 21 through 24 are allowable because the Cope patent does not anticipate nor render obvious the present invention. The rejections under 35 U.S.C. §102(b) and 35 U.S.C. §103(a) should be reversed. The appealed claims are attached hereto as exhibit A, while Figure 1b is attached hereto as Exhibit B.

Thank you.

Respectfully submitted,

Dated:

February 18, 2004

  
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EXHIBIT A  
The Appealed Claims

21. A synthetic wood-like product having an external foam skin and a foam core, and being of low density, stable dimension, wood-like surface quality, good flammability resistance and outdoor weather durability, made by the method that comprises:

A.) forming a mixture containing:

(a) about 70 to about 100 parts by

weight of vinyl chloride resin;

(b) about 10 to about 100 parts by

weight of a natural cellulosic product;

(c) about 0.5 to about 10 parts by

weight of vinyl chloride resin foaming

agent;

B.) mixing the aforesaid mixture in a hot

mixer with frictionally induced heating

to temperatures of about 80 degrees Celsius and to about 140 degrees Celsius and below the fusion temperature of polyvinyl chloride;

C.) subsequently mixing the mixture from said hot mixer in a cold mixer while cooling said mixture to a temperature of about 25 degrees Celsius to about 60 degrees Celsius;

D.) plastifying and extruding the mixture through a plastifying and extruding means; and,

E.) slowly cooling extruded product to create a synthetic wood-like product having an external foam skin and a foam

core, wherein said cooling is performed in a roller system of a plurality of contra-rotating rollers, said synthetic wood-like product having a surface embossed texture and having a Shore Harness of at least about 50 D-scale, as measured according to ASTM D2240.

22. The synthetic wood-like product of claim 21 wherein said step A.) mixture further includes:

(d) about 0.1 to about 100 parts by weight of additives selected from the group consisting of heat stabilizers, processing aids, colorants, lubricants,

fillers, flame retardants, ultraviolet  
light inhibitors, and mixtures thereof.

23. The synthetic wood-like product of claim  
21 wherein said plastifying and  
extruding steps are performed in an  
extruder.

24. The synthetic wood-like product of claim  
21 wherein said mixing step in a hot  
mixer is performed to a temperature in  
the range of about 80 degrees Celsius to  
about 140 degrees Celsius.

EXHIBIT B

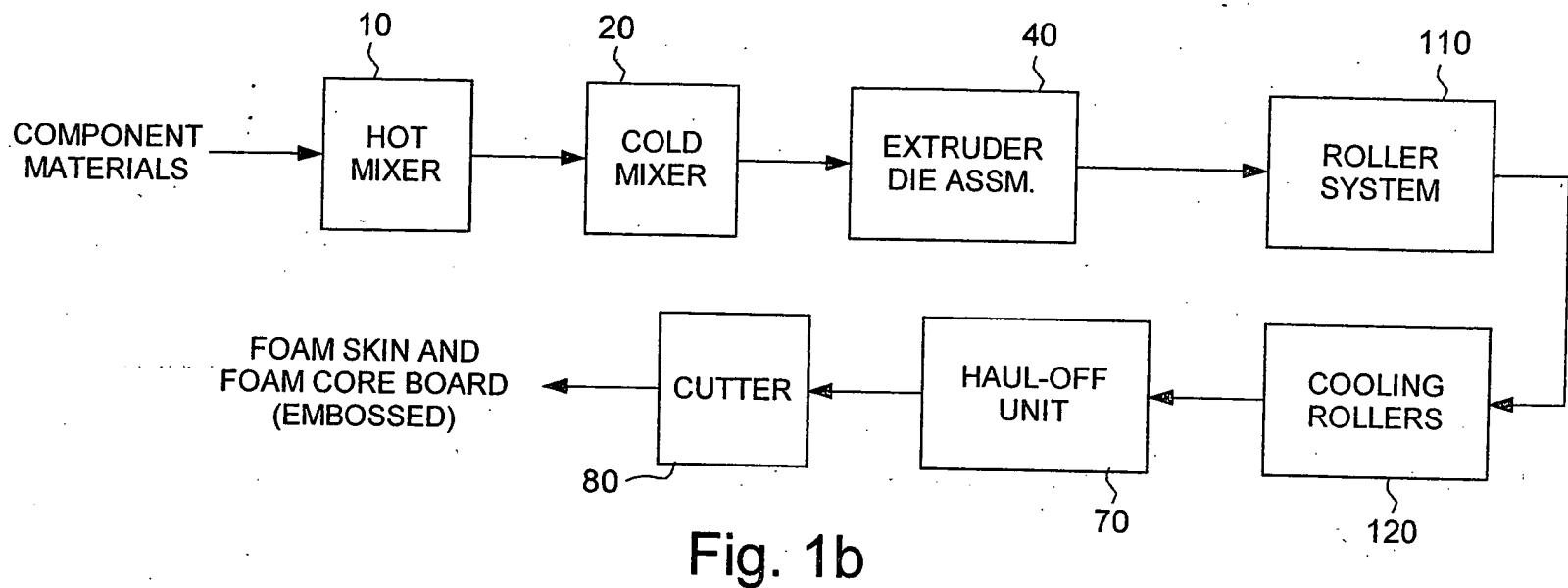


Fig. 1b

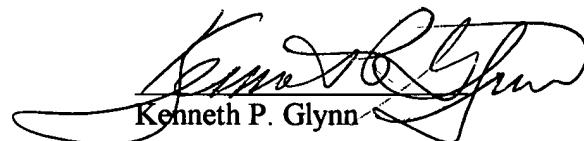
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
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In re Application of : Examiner:  
KUNG-LIANG KEVIN SUNG et al. : ALLAN R. KUHNS  
Serial No. 09/753,428 : Group Art Unit:  
Filing Date: January 3, 2001 : 1732  
Title: METHOD OF MANUFACTURING :  
WOOD-LIKE POLYVINYL CHLORIDE :  
BOARDS OF LOW DENSITY AND :  
IMPROVED PROPERTIES AND :  
RESULTING PRODUCT :

Honorable Director of Patents and Trademarks  
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Kenneth P. Glynn

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Serial No. 09/753,428  
Attorney Docket No. IPC-109A